

Flexibility should be maximized in order to serve the needs of a burning plasma science program

- Configuration flexibility helps ensure success of this device and of a DEMO.
- A flexible, well diagnosed, scientifically focused BPX can inform science of innovative concepts, and might incorporate innovations developed off-line
- A flexible, well-diagnosed BPX will enable systematic studies that advance basic plasma physics

Requirements for AT access difficult to assess: flexibility is key

- There are myriad ways in which AT regimes are entered. Those factors observed to be important include:
 - Spontaneous core flow generation
 - q_{\min} = simple value
 - Pellet injection into core, esp. with reverse shear target
 - Strong unidirectional injection
 - Low core current density
- Flexibility helps ensure access and learning of important science. Observed aids include
 - Pumping for central deposition
 - Strong central heating
 - ROTATION
 - Pellet injection, high field launch
 - Current density control
 - Separate heating of ions and electrons
- Excellent measurements required to exploit these tools

Desirable attributes regarding flexibility and measurements in a BPX include...

- Profile control tools

- Localized heating
- Current drive
- Rotation/flow shear
- Pumping
- Pellets

ITER-FEAT

NBI,ECH,LH,ICRF
 ECCD,LHCD,NB
 NBI; RF?
 SN
 HFS

FIRE

ICRF,LH
 LHCD,ICRF
 RF?
 DN
 Vert, HFS

IGNITOR

ICRF

 RF
 Limiter?
 Vertical

- Diagnostics

- q profile
- Kinetic profiles; resolution
- E_r
- Core turbulence, low and high k

MSE(resolution, duration?) MSE(resolution?) ---
 Full (resolution?) Full (beam upgrade?) Full (no beam)
 -----To be discussed-----
 <-----listed; development level? priority?----->

- Shaping

<----- more limited than present ATs----->

Proposed points for discussion

- Will key elements of flexible operation to help ensure ITB access, and potentially control, be in place?
- What key elements are missing from any one device?
From all devices?
- Can new control tools be *applied to* the BPX if developed elsewhere?
- Can new control tools be *developed on* the BPX?

Presentation/discussion

- Greenfield: flexibility assessment from E2 group (15 min)
 - Discussion (& compare with P4 evaluation)
- Gormezano
 - Discussion
- Staebler
 - Discussion
- Porkolab (10 min)
 - Discussion